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## ORIGINAL ARTICLES.

"Of all the arts in which the wise excel,
Nature's chief masterpiece is writing well."

### A SYSTEM OF TREATMENT FOR EXPOSED PULPS.

BY A. H. BEST, M. D., L. D. S. R. C. S. I.

If there is a condition that more than another is calculated to disturb the equilibrium of a dentist's mind it is that of exposed pulps. The multiplicity of circumstances which surround these cases, and which are more often of a detrimental character than otherwise, frequently evade the grasp of the average practitioner, and failure is the almost inevitable result.

An excedingly troublesome source of misunderstanding, which in large measure contributes to such failures, consists in the unsettled manner in which certain observations are made, conjoined with the arbitrary way in which the results are classed. It is not at all rare to find an operation rated as perfectly successful which might be more correctly characterized as the reverse. I may say in this connection that in our profession as in every other, there are a number of well-intentioned people who have a fashion of describing everything that they undertake as "a success." This peculiarity is not always to be attributed to a desire to appear of superior manipulative ability to their neighbors; there is probably in most cases an honest inten-

tion,which innocently leads to representations that are unsupported by a correct judgment as to what is and what is not success.

I have seen from time to time articles on the subject herein treated, and recall to mind such passages as the following, (I quote from memory):

"After the rubber dam was adjusted, which we invariably do in these cases, the cavity was made perfectly dry, after which we removed the carious portion of the tooth structure,leaving that portion of caries that covered the pulp intact, so as not to expose the pulp. We then took a small piece of cork, shaved thin, saturated it with carbolic acid, applied it directly over the pulp as a capping, and filled with amalgam, etc. The operation was a perfect success, the patient not having experienced the slightest pain, either during the operation or after the dam was removed."

Now I think I can unhesitatingly say that such declarations as the foregoing plainly show a deficiency of practical judgment, a lack of powers of observation, or a non-appreciation of the ends desired. It is quite probable that there is scarcely a dentist of any practical experience whatever who has not often seen a perfectly exposed pulp, causing no pain whatever, unless touched or irritated; but was the absence of hyperesthesia in such a case, evidence that the pathological condition was all that could be desired? I apprehend no one will pretend that such was the case, yet this tooth, barring the filling, is in the same condition as that one above described after the operation which was declared a perfect success.

A curious fact concerning the novel writers of the world has often claimed my attention; it is that nearly or quite one half of these writers are philosophical observers,determined investigators of abstrusesocial problems,while the other half possess no powers of individual observation,but are earnest and attentive students of the first half with an original manner of dealing with abstract and deduced principles. What is true in one branch of literature may be assumed to exist, more or less distinctly observable, throughout the whole, and dentistry can certainly not demonstrate any exception to this rule in her favor, considering that every science appears subject to it.

I have noted in the writings of some of our best and most successful practitioners, that they invariably leave a layer of decayed dentine over the pulp rather than expose it to the contact of foreign material. But however good this theory may appear, and no mat-

ter how flattering may be its success in the hands of an expert, it is pernicious. Either these gentlemen do not do what they recommend, or if they really do it, their ideas with reference to the decayed portion permitted to remain are such that the average practitioner cannot grasp them, for what the latter would call a layer of decayed dentine, and would therefore propose to leave over the pulp, the former would undoubtedly condemn and remove as superfluous and detrimental, while vice versa, what the former would call a layer of carious dentine, the latter would be willing to declare was absolutely healthy tooth structure, only perhaps slightly discolored. Thus we perceive that two conditions, one comparatively harmless, the other directly opposite, would be spoken of by the different operators producing them, as one and the same; and the actual difference could not become apparent unless the cases were presented for comparison.

We all know that some dentists do better work than others, and yet those below the standard are not to be hastily accused of negligence, for personal observation assures us that they are, for the most part, earnest and determined workers; that they fail despite their best efforts. But why, then, is it so? There must be some reason, and since one does with ease what the other never can do, we are constrained to admit that some inaptitude affects the judgment of the latter.

Here, then is the key to the difficulty, this inability is a matter of judgment.

Each of us we hope is an earnest worker; failures must therefore in the majority of cases, arise from a want of judgment, of just appreciation of surrounding circumstances, of adaptation ofm eans to ends.

We are thus obliged to admit that circumstances which insure success are to be recognized and allowed for as well as those which indicate a failure, were certain operations attempted. The absence of those conditions which are invariably associated with unsuccessful operations does not warrant a prediction of success,which must be founded on the presence of all those qualities that are known to promote it. The conditions to be fulfilled will of course depend(1) upon the operator, (2) the patient, (3) the particular kind of operation, and (4) surrounding or accidental influences. No fixed rule can be laid down to be unswervingly followed, so as to avoid the exercise of judgment; each case is as surely and truly a law unto

itself as it is possible for it to be, and success will attend the efforts of the operator in exact ratio to his appreciation of this fundamental truth. It matters little whether the dentist is adapting an artificial denture or filling over exposed pulps to save teeth; this principle must be adhered to for only by a skilful adaptation to the particular case in hand can real satisfaction be insured.

But it is only with exposed pulps, and the condition preceding that state, as consequent on caries, that we are at present concerned. It is a natural result of the action of caries that the pulp should be left protected by but a very thin septum of dentine; this condition, described by the epithet "almost exposed" is one that does not generally attract the notice of the average operator. Hence teeth of this description, after being filled, exhibit a most tormenting degree of thermal sensibility; a cup of hot tea or a glass of ice water excites a paroxysm of unbearable pain,which is fortunately of brief duration. This pain is more severe, and the sensitiveness to slight changes of temperature more marked in proportion as the stratum of dentine between the pulp and the metallic filling is reduced. This condition leads to one of two results; that is to say, either healthy action sets up in the pulp, which protects itself by a deposit of sound dentine, or the filling gives rise to so very much irritation as to cause inflammation and finally death of the pulp. In the former case the tooth is in a comparatively good condition until otherwise affected; in the latter alveolar abscess is the invariable result, and its appearance only a matter of time.

How to insure the first result? How to decide which is sensitive dentine, likely to take on healthy action after the filling is inserted, and which is the almost exposed pulp whose thin shield will transmit thermal changes with sufficient rapidity to excite the dangerous inflammation culminating in death of the pulp? And having drawn the line between the almost exposad and the actually exposed pulp so far as the diagnosis is concerned, how do the same as regards the treatment?

Let us suppose the pulp fully exposed; what then is the nature of this exposure? Is it quite recent, or of comparatively long standing? Is the pulp healthy or diseased? If the latter, to what extent? Does it seem amenable to treatment, or has the affection precluded all possibility of a return to health? In a word, what are the conditions? What is to be done? What is the best manner of doing it, and why? All these questions, and a hundred others,

are constantly being presented, or should be, to the mind of every dentist; and the success of every dental operation naturally depends upon his capability to answer them correctly, that is, upon his more or less well-balanced judgment.

"Oh! my tooth! how it aches since I had it filled!" This phrase of lamentation goes up from thousands of tea-tables throughout the land every day. The universal appeal might well induce a philanthropist to ask "why does it ache?" The cause is plain: the operator has failed to recognize and take advantage of the special circumstances of the case, in the manner calculated to insure comfort and what we call "success;" or though he recognized them, he lacked practical ability. In the meantime, how much suffering results to the patient! "How my face is swelled, and such pains as I do have in my jaw and head!" "Indeed, is it so?" says a friend, "I can sympathize with you; but what does your dentist say?" "Oh! I just had my tooth filled last week, and he says I have caught cold in it, and have neuralgia. He told me not to take cold in it, but you see I did so after all, so I suppose it's my fault."

Another class of failures that constantly occur is occasioned by not treating with proper care the vital part of the tooth filled.

I have known cases where a patient presented himself for an operation, and, after the usual preliminary conversation, took his seat in the operating chair, when the following colloquy ensued:

"This is the tooth I want to get filled"—"Oh yes, very large cavity" (says the doctor who is anxious to thoroughly impress that fact on the patient's mind); "I shouldn't wonder if the pulp is exposd; but we'll soon see." (He takes the syringe and injects a little cold water.) "What! no pain! really, I'm very much surprised; quite expected to find an exposed pulp. I will clean it out a little." (Uses his excavator; at first cautiously, then vigorously.) "Well, now! really you may congratulate yourself; the pulp is not exposed; I'm quite astonished, it is such a large cavity." He revolves in his mind the prospective fee, and says: "Well, I can fill that tooth for you immediately; did you wish it filled to-day?" Patient answers in the affirmative, but proposes to leave the matter to the better judgment of the doctor. "Since the pulp is not exposed," says that authority, "it had better be filled at once." The operation is accordingly accomplished, and for a week or so appears to have been a "success;" but clouds are hanging

on the horizon, and soon there is unmistakable threatening of a storm. "My! what a pain in that tooth!" complains the luckless patient some morning at breakfast. "I could hardly sleep a wink last night on account of it. Then the tooth actually seems longer than my other teeth; it is very difficult to eat for I cannot close my teeth; and my face has begun to swell. I must away to my dentist at once." He finds his dentist "very busy but will give him a few minutes as soon as he can." The patient being a gentleman accustomed to good society, of course sits down and quietly waits until the doctor can see him. He explains his trouble to the D. D. S., who is overwhelmed with sympathy; the doctor is "very sorry, but it was a very large filling, and you have certainly taken cold in it, which has set up neuralgia." The patient hints that there may have been something wrong about the tooth that escaped observation on the first examination. But the doctor indignantly declares "that there was nothing wrong; there was no pulp exposed; and he wishes, as politely as possible, to inform his esteemed patient that he is a regular graduate of one of the oldest colleges in this country, and ought to know his business. The whole trouble is nothing but neuralgia, which will form a gum-boil, and get well," which prediction is usually verified, at least in part, i. e., the gum-boil.

Of course the very circumstance of the operator's not finding a very large cavity sensitive should have at once suggested the probable death of the pulp, a condition which could not be overlooked without entailing consequences sometimes still more disagreeable than those above described.

To many members of the dental profession these instances will seem overdrawn and exaggerated; the better class of operators will think such negligence beyond the pale of credibility; but there are those who have observed similar cases so often that the recital will have but little novelty for them. I do not wish to be understood as asserting that under all circumstances it is possible to avert unpleasant complications, such as neuralgia, or even abscess; on the contrary, these terminations are, unfortunately, sometimes unavoidable; they should, however, be the exception, and not the rule. In fact, when a tooth is properly treated by a skilled and observant practitioner, it is very rarely the case that any trouble arises. Success depends, for all that, upon so many considerations, that any lack of vigilance on the operator's part is only too likely to diminish the chances of preserving the tooth.

Actually exposed pulps may be spoken of as practically forming two classes, viz., those that can be saved, and those that cannot. The first division embraces pulps recently exposed, not inflamed, suppurating, nor sloughing; besides several cases exhibiting such symptoms as a consequence of irritation produced by extraordinary causes, combined with a vigorous constitution. The second division embraces those cases of exposure of the pulp and breaking down of the pulp chamber not comprehended in the first class; and in which absolute devitalization and extirpation appear essential to complete success, with such after treatment as the urgency of the case may demand. We will endeavor to confine our remarks to those conditions indicating conservative treatment, i. e., to the first class.

Simple cases of sensitive dentine require very simple but effective treatment, which contributes but little to the success of the operation as a mechanical result, but very largely to the comfort of the patient. Many operators do not attempt in any way to counteract the liability to pain from thermal changes; but others, and among these the better class of dentists, exercise every precaution for that purpose.

Some fill the bottom of the cavity with oxychloride of zinc, a most valuable material in the proper place, but inadmissible in cases of an exposed or almost exposed pulp; for while the oxychloride seems to exert a decidedly beneficial influence upon sensitive dentine in cavities, the escharotic action of the chloride of zinc appears to be exercised unchanged upon exposed pulp tissue, so as to destroy many pulps intended to be saved. For this reason, as well as on account of the pain attending the application of the oxychloride to exposed pulps or to sensitive dentine, many practitioners have entirely abandoned its use and rely solely on preparations that combine lack of conductivity with non-caustic properties.

For sensitive dentine, gutta-percha in one form or another is used with great success; but where pulps are almost or quite exposed, it is not safe to rely upon it; for the heat necessary in its manipulation, and the pressure necessary to make it cohere, are often too great for the delicate pulp-tissue, and produce the very irritation we seek to avoid.

A solution of gutta-percha in chloroform is however of great benefit in many cases in which the other forms of that material

are not admissible. The delicacy with which it may be applied, even directly over exposed pulps, and its efficacy as a covering material render it a very desirable auxiliary in many cases where gentleness is as essential a feature of manipulation as thoroughness.

This solution is improved by a slight addition of "carbolic acid;" the same effect is obtainable by touching the exposed surface, after it has been made perfectly dry, with full strength solution of crystallized pure phenol, previous to coating with the solution of gutta-percha. The coagulation of soluble albumen in the animal fluids produced by this agent interposes a slight barrier between the still sensitive pulp and the gutta-percha. But even when the pulp is not exposed at all, there is still much benefit from the adoption of this course, from the sanative influence exercised by phenol upon diseased dentine.

The advantageous use of the solution of gutta percha in chloroform extends over all cases in which direct contact of a metallic filling material with exposed pulp or sensitive dentine will, it is feared, act as an irritant. In such cases a heavy and impervious coating may be easily interposed upon the floor of the cavity, and with proper precautions in the introduction of the filling material, the disagreeable results may be considered as effectually prevented. Cases of almost exposed pulp in which the injection of cold water produces intense pain, may also often be treated in a similar manner, with the advantage of comfort to the patient, and enhanced durability of the filling. It is well, after the coating of gutta percha has been applied and the chloroform has evaporated, to cap over the weaker part of the pulp-chamber with either oxyphosphate or oxychloride, mixed to the consistency of cream and gently flowed into position, being then allowed to set, without any pressure or packing.[1]

From what precedes it will appear that the solution of gutta-percha is a very valuable auxilliary, by means of which we are enabled to fill almost every kind of cavity, from a case of sensitive dentine to one of absolute exposed pulp, without incurring any grave risk.

For the treatment of sensitive dentine, a condition which, with

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1. Since writing the above, I find these suggestions, which were based solely on practical results to be substantiated by the experiments of Dr. Miller of Berlin.

the average practitioner, includes also that other which we have characterized as almost exposed pulp, many other methods are recommended, but all depend on preventing contact of filling and pulp-tissue, by interposing a thin stratum of some impervious material, a thin shaving of cork, a scrap of gold-beater's skin, lead foil, goose-quill, even cotton-wool, etc., all which expedients are in their way successful, but not with that kind of success which some of us would like always to see. We usually find teeth filled in this manner to appear very dark, indicating either the death of the pulp, decomposition of the protecting material, or both results at once; the filling nevertheless may remain, the tooth be moderately comfortable, though, oh! how unsightly!

I presume all are familiar with the Weston pulp caps, and know how efficient these little contrivances are when properly used. I am free to confess they have been of great service to me, being so convenient and handy. I adopted them as soon as they came out. Before that time, I employed the same idea the only difference being that mine were made of vulcanite. The method that yielded the largest number at least expense of labor and trouble may be worthy of insertion in this place.

Take one half of a flask, fill it up even with plaster of Paris, finish off smooth, then with a small hammer drive the whole surface full of small round-headed carpet tacks. Spread over the models thus prepared a very thin layer of wax, no thicker than paper; burnish over it a sheet of lead or thick tin-foil, taking care to bring out the heads as accurately as possible; the edges of this foil are then turned up so as to be caught in the plaster. The other part of the flask being now placed in position, plaster is poured in, in the same manner as if we were flasking a set of teeth. When the plaster has set, the entire flask is placed in the boiler, and opened when warm, and the wax gently scalded out with hot water; then pack with rubber, and vulcanize in the usual manner. The supply of caps thus obtained is of a size especially useful in many cases, and the trouble of making them is not comparable with the convenience they afford. They are not applicable to every cavity, but their form admits of much alteration, a circumstance that increases the range of their adaptability.

These caps are usually applied with the concave surface toward the pulp, precautions being taken that no part of the edge of the cap rests upon the sensitive organ it is intended to protect. It is

of course highly necessary to satisfy one's self of the healthy condition of the pulp before, as it were, battening down the hatchways, and leaving it to work out its own salvation, or the reverse.

It is requisite to exclude the air from the space between the cap and the pulp; to this end the concavity of the cap is filled with some paste, usually a mass of oxide of zinc mixed with phenol-(carbolic acid). In my hands better results have attend ed the use of a mixture of phenol and Canada balsam, equal parts, with which just enough oxide of zinc is rubbed up to form a paste of creamy consistency; the concave part of the cap is filled with this paste, and the cap applied warm; after which the tooth is filled, and when the operation is conducted with due regard to the condition of the tooth, I can safely say that a greater percentage of pulps may be saved by this than by the former application.

I was led to employ the balsam in this manner from a knowledge of the custom of the people who live among the pine forests of our Southern States. In these regions it is seldom that any other remedy is applied to fresh cuts or wounds besides fresh turpentine. This practice is so prevalent that it is hard to find a farm house in the rural districts, that does not possess a fresh "box" cut in some neighboring pine-tree solely for use in case of accidents of this character.

Their usual manner of applying the turpentine is to stop the blood in any convenient manner, more generally, perhaps, by compression on the wound with a dry cloth; they then dip the crude turpentine from the box, spread a thick layer over the wound, and apply over the entire surface a piece of cloth, thus improvising a kind of rude sticking plaster. This plaster is usually left in position until it falls off of itself,when the wound is found entirely healed and needing no further treatment.

A consideration of this practice led me to try the same, or at least a similar remedy in some cases of exposed pulp where the pulp had been accidentally wounded and had bled a drop or so. The first cases thus treated were cleansed of the blood immediately over the pulp; the cavity was dried with warm air from a syringe; a paper cap was cut to the size requisite to cover the floor of the cavity; this cap was held in the pliers, some distance over the flame of a spirit lamp,and the solid balsam brought in contact with

the upper side of the cap, so that when it melted sufficient could be received on the paper to give an even coating over the whole surface. This cap was then applied, balsam next to the pulp, exactly as if one wished to apply a bit of sticking plaster. That the cap may be adjusted in position a small pledget of cotton saturated with phenol is employed to gently press it into place; the paper at the same time becoming saturated with the preservative, adapts itself to the cavity. Any excess of balsam oozes from beneath the pad, and is rendered easily removable by the acid. The cavity is wiped out carefully with bibulous paper; it is then ready for the filling which in these extreme cases should always be one of the white cements, mixed rather thin, flowed into position, and allowed to set without packing or pressure. This filling should be permitted to remain until we feel tolerably certain that the pulp has taken on healthy action: a period which ranges in different subjects, from three weeks to three months, and sometimes longer. If no symptoms of an unfavorable character manifest themselves, the tooth is assumed to be ready for excavating the temporary stopping and inserting a metallic filling; a delicate operation, but not difficult, and giving usually very satisfactory results when properly executed.

But if the tooth is intended to receive a permanent filling at once, without this preliminary treatment, a pulp-cap must be inserted to prevent pressure upon the pulp, and save that organ from the influence of thermal changes.

In cases of sensitive dentine, as well as that condition which I have styled almost exposed pulp, there is nothing in my experience that so fully meets the requirements as this paper cap, pasted in position, as it were, by Canada balsam. Even those cavities where there is scarcely depth enough to permit any other capping and yet retain the filling, may be made comfortable by this treatment, while nothing is detracted. I believe I have tried nearly every method, with a view not only to save teeth by filling, or preserve the life of pulps, but to make teeth so treated comfortable; and I can safely say that the treatment above explained has been as universally successful as the range of possibilities seems to permit; and I measure my successes, not by days or weeks, but by years.

# A METHOD OF MOUNTING A PORCELAIN-FACED CROWN.

BY A. O. HUNT, D. D. S., IOWA CITY.

Read before the Iowa State Dental Society, May 1884.

One very important part of dental technics is that of crown setting.

There are many methods of doing this, some of which are very practical and easy of accomplishment when conditions are favorable.

When roots are crowded, the surrounding parts are subject to a class of diseases that are difficult to treat unless the pulp canal can be utilized, through which to pass the various therapeutic agents to be employed.

By the usual method of attaching a crown it is necessary to remove it whenever treatment is to be resorted to. Such removal means destruction to the crown; as one well adjusted will in nearly all cases be so badly mutilated in the operation that it is much easier to make a new one than to restore an old.

Again, most of the methods are adapted to roots that are firm and after being cut off to the line of the gums, retain all their normal strength and form. It is often necessary to operate with roots whose buccal, lingual or lateral walls are disintegrated nearly or quite to the alveolar process.

The interior of the root may be coned out deeply, exposing frail and ragged edges, with the gum tissues overlying these edges.

The method I shall attempt to describe is one suited to these latter cases, i. e., roots with frail and ragged edges, with the gum tissues overlying and filling the crown end. The following method will overcome most if not all of the difficulties in the way of success, and allow the setting of a crown that is durable, and useful. To get good access to the root, first pack it with soft gutta-percha pellets, pressing the material out over the edges and building on until the gum is displaced, so that when the gutta-percha is removed a large and free opening is had through the gum, and the edges of the root are fully exposed. This packing should remain two or three days. With a thin platinum ribbon (33 gauge) form a tube, place it over the end of the root and bind with fine wire, twisted until the platinum conforms to the shape of the root.

If the edges are too frail, fill with amalgam in the following manner:

First roughen the inner side of the root or cut ledges if admissible with an engine burr. Select a broach that will enter the apical foramen. Leave this in the canal while inserting the amalgam. Restore the contour if lacking at the same time, and withdraw the broach carefully.

The channel thus formed will be a guide in drilling. Wait a day or two for the amalgam to harden; now the end of the root will present a firm face and shoulder, nearly as good as though the walls had never been destroyed.

With tube over root in place, prepare enough plaster (plaster two parts, sand or asbestos one part), and take an impression of this and adjacent teeth, seeing that the plaster fills the tube down to the root.

When the impression is removed with the band, dry thoroughly. Pour into it Babbitt metal, (Grade C), or Watts or Reese metal.

Break away the plaster and remove the platinum tube, trim away in the metal that portion that corresponds to the gum tissue, leaving a correct model of the end of the root over which to place the permanent band of gold. Fit this tightly to the model, turning a flange over the labial edge, as a rest for the porcelain face. Now prepare the following: Hollow platinum wire (No. 60), a twist drill a trifle smaller than the wire with cutting end cone shaped, so that it leaves the bottom of the drill-hole in that form.

Hard wax composed as follows: Gutta-percha one part, pure beeswax two parts, and sufficient resin to form a mass that will be hard at the temperature of the body. Platinum rolled foil (say No 45 guage, to be used as backing for the crown). Put the gold band in place over the root in the mouth, so that the flange is below the gum line.

Follow the pulp canal with the drill, securing as deep a socket as may be.

Select a suitable plain plate tooth (pins cross-wise preferred), grind to fit, resting the cervical end on the flange of the band.

Lay a piece of the platinum foil on a soft wood surface and press the tooth pins through it. Burnish the foil down to the tooth and over the approximal, cutting the cervical edges so that at the latter point the foil will be between the tooth and the flange. Adjust the tooth so prepared to its place, driving the platinum tube or

wire into the drill hole, allowing it to extend to the cutting edge of the tooth. With a hot instrument (flat burnisher), melt hard wax about the tube, inside the band and on the backing of the tooth.

Arrange everything now as you would have it when finished. With plaster and sand, or asbestos, the same as before, take an impression. Should the tooth and band not draw out with it they can be removed and put in place in the impression.

Fill all with a mixture of plaster and sand. Remove the cup and trim down on the lingual side, exposing and removing all the wax. Bend the tooth pins np close to the tube, fill the tube with a piece of broom straw dipped in wet plaster.

Flow solder around these and down over the thin platinum backing until the whole is united to the band at the flange, and a good body of it on the backing. Fit a shell of gold the same grade as the band to the lingual side, resting on the band and fitting the backing closely at the approximal edges and around the tube, which should extend outside of the shell. Solder this in place and finish with files, etc., to a contour corresponding to the tooth being mounted.

Whatever of the tube projects, file off as surplus material.

Place the crown when finished in place, perfect the articulation. Remove and attach with cement (Caulk's Diamond preferred). When mixed to the consistency of cream it gives ample time for the work, and sets hard and firm. Remove the piece of broom corn and plaster from the tnbe; free access can thus be obtained through this channel, for treatment now or at any future time.

Fill the tube nearly to the end with cement, closing up with a gold filling.

The advantage of this method will be readily seen. It can be used on any tooth, in any part of the mouth.

In bicuspids with two roots, two tubes may be used; and the shell for the lingual side, formed over a piece of dry hickory or other hard wood or swaged over metal dies. In molars a tube may also be used for each root.

Another advantage is in having a hollow pin or wire, nearly the combined length of root and crown, firmly imbeded in cement, giving great strength with lightness. Another, the crown is easy of construction, requiring only those instruments usually found in any well appointed dental office. Still another, it is durable; and the manipulation is postive and adapted to any shape of root.

In one case where this method was employed the root was but ⅝ of an inch in length (a superior second bicuspid) and quite loose, accompanied with ulceration. So frail that any method of band crowning would have been doubtful.

By this method and with good results in treatment after seventeen months of usage, the root is firm, the crown unimpaired, and all doing the service of a good tooth.

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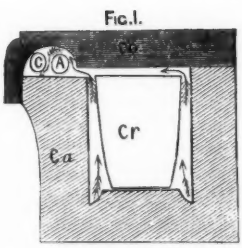
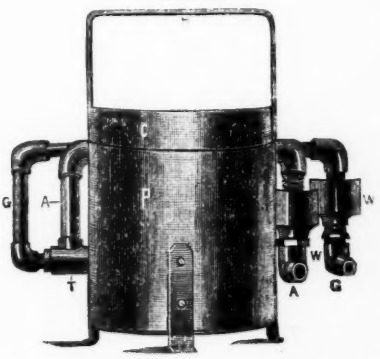
## A GAS FURNACE FOR METALLURGY.

BY WILLIAM HERBERT ROLLINS, BOSTON, MASS.

This is the second of a series which has been devised for my laboratory. I have already described a gas muffle furnace in a paper read before the Society for the Advancement of Oral Science,[1] and

FIG. 2.




shall hereafter publish accounts of the others. My object is to contribute something toward banishing from the laboratory such antiquated substances as solid fuels. Gas furnaces are superior to those using solid fuel, for they are more rapid in action, and are free from dirt and smoke. With them the required temperature can be maintained at any given point for any number of hours.

All the furnaces of this series presuppose that the laboratory is supplied with an air blast. Even for the small blow-pipe this is required, as it seems absurd to blow a fire with the mixture of carbonic acid gas and nitrogen given off from the lungs.

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1. Published in Med. and Surg. Journal, of Boston, Oct. 23, 1884.

The furnace shown in figs. 1 and 2 is so simple that any one can construct it for himself. Indeed this is probably the only way in which it can be had, as the makers of dental supplies do not usually care to place any article on the market unless they can be protected by a patent.

Fig. 1 is a section through the furnace. This consists of a pot of porous fireclay Ca with a cover Co of the same material. Between the lip of the cover and the pot is an opening through which the waste gas escapes, surrounding on its way the tubes A and G for air and gas.

Fig. 2 is from a photograph of the furnace. G is the gas tube. A is the air tube. Both are attached by rubber tubes to the gas and air mains. W-W are two cups filled with water, which prevent the tubes G and A, which are white hot under the cover C, from burning the rubber tubes where they are attached at A and G. As before mentioned the tubes, A and G pass under the cover and appear again on the other side, where the tube G enters the tube A, forming a tuyere, the mouth of which fills the opening through the wall of the furnace pot.

In these respects the furnace is simply a small blast furnace.

The gas and air remain apart till they reach the mouth of the tuyere, when they unite and, passing up on all sides of the crucible Cr. Fig. 1, go over its top and escape under the cover, passing all around the gas and air tubes which they heat white hot.

No claim is made that this furnace "will melt steel in five minutes" and any one familiar with metallurgy will see that the principles used are old. Porous fire clay was known in Strabo's time, hot gas and air burned at the mouth of a tuyere placed against an opening in the wall of a furnace have been in use in blast furnaces ever since I can remember, though T. Fletcher has recently invented them in his so-called injector furnaces, another case of adopting other men's ideas without credit.

Any ordinary illuminating gas, works well in the furnace, but the efficiency is greater if the gas is passed through naptha as described in my previous paper.

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Country Doctors can render their shoes water-proof by soaking them in a strong solution of soap for some hours. The compound forms a fatty acid within the leather, rendering it impervious to water.

# TRANSLATIONS.

## ON THE HISTOGENY AND HISTOLOGY OF THE DENTAL ORGAN.

FROM PROGRÈS DENTAIRE.

[CONCLUDED FROM PAGE 517.]

### PART II.

HISTOLOGY OF THE DENTAL ORGAN FROM ITS ORIGIN TO ITS COMPLETION.

Like the nails, the skin, the hair, etc., the structure of the teeth is composed of two very different substances; one represented by the tooth, properly so called, the other germinative, composed of the bulb and the alveolo-dental periosteum in the adult, and in the fœtus by the dental follicle. Of these two forms, the first, intended solely for mechanical necessities, is characterized by its color, its hardness, and by the energetic resistance it offers to physical agents.

This substance possesses neither vessels nor nerves, properly speaking. The other, on the contrary, is abundantly supplied with them; it is soft, and to it must be attributed the phenomena of sensibility which we meet with in the tooth.

In the histologic study of the tooth, we must, then, divide it, as does our subject, into two portions. In the first are comprised the hard parts, the dentine or ivory, the enamel and the cement; in the second, the soft parts, viz., the pulp or dental germ, and the periosteum or alveolo-dental membrane.

#### HARD PORTIONS OF THE TOOTH.

Of these three parts, the ivory or dentine is the most essential and the most important in the constitution of the tooth; it surrounds the whole dental cavity and consequently contributes to the formation of the crown, of the neck and of the root. The enamel covers that part of the dentine which corresponds to the crown and extends, continually diminishing in thickness, as far as the lower portion of the neck. The cement covers the root of the tooth, and becomes thicker as it approaches the end of the root of the tooth

and thinner towards the neck, encroaching slightly on the enamel that covers the crown.

The dentine is therefore exposed at no point, and the tooth may be considered as composed of two layers closely united, one internal and thick, formed of the dentine, the other superficial, formed of the enamel and cement. Each of these substances has its own peculiar structure.

A.—Ivory or Dentine.—The dentine, in a fresh preparation, is a yellowish and semi-transparent substance; in a dry preparation, it is of a pearly gray. It is harder than bone or cement, but softer than enamel. The external surface of the dentine is covered, as we have seen, by the enamel on the crown, and by the cement on the root. Upon the crown it is filled with minute concave and hexagonal depressions, demonstrated first by Owen and Huxley, and destined to receive the extremities of the enamel prisms. On the root, the external surface of the dentine is uneven and rough, with inequalities filled with cement. The internal face of the dentine corresponds to the cavity of the pulp and to the dental canaliculi which derive their origin from it. This cavity, very large in the infant, a period at which the pulp is very voluminous, diminishes gradually with age. This circumstance, according to Magitot, enables us to say that in man the growth of the tooth is continuous, a growth made at the expense of the cavity, whose capacity diminishes gradually, to almost entirely disappear under the incessant production of dentine.

Considered histologically, the dentine is composed of two elements. 1. A fundamental substance; 2. Numerous canalicules which traverse this substance in a direction from the cavity of the tooth towards the enamel and cement. The fundamental substance is always homogeneous, and, even when greatly magnified, it never appears granular or fibrous. Submitted for a while to the action of hydrochloric acid, it breaks up into great fibres parallel to the direction of the canalicules, and these fibres may in their turn be decomposed into smaller fibres, thus simulating a fibrous tissue. But it may be easily seen that these fibres have an irregular form and are purely artificial. They result in fact from the disposition of the tubes which, running parallel to each other, intercept portions of dentine, to which the decalcification gives the aspect of fibres. The fundamental substance is found in various proportions in the different parts of the dentine; thus, in the external portions

subjacent to the enamel and the cement, it is more abundant than in the vicinity of the dental cavity; where the canalicules are extraordinarily close. The external surface of the dentine is surrounded by a continuous layer of dark granulations quite numerous and of diverse forms.

This granular layer was taken by Retzius and J. Muller for a mass of bony corpuscles, in which the canalicules of the dentine terminated. But a close examination shows that, although the granulations are continuous with the terminal extremities of the canalicules, we should not mistake them for true bone corpuscles. According to Magitot, already cited, they should rather be regarded as minute lacunæ, hollowed in the thickness of the dentine, at its exterior limit, to facilitate communication between the tubes which furrow this tissue.

This granular layer is called by modern histologists the *anastomotic plexus* of the dentinal canalicules.

These dentinal canalicules were discovered in 1678 by Leuwenhoeck. They are microscopic tubes, hollowed in the body of the dentine, whose diameter varies, according to some, from .002 m. to .005 m., and according to others, from .002 m. to .0015 m. They open into the dental cavity by an orifice which is found in immediate contact with the surface of the pulp, and have a general direction perpendicular to the surfaces of the dentine.

The number of these canalicules is so large that their walls nearly touch. At their origin, at the surface of the pulp, they send off lateral ramifications; finally they undergo a first bifurcation, whose branches are soon subdivided many times, so that a single primitive trunk may, according to Kœllicker, give origin to as many as sixteen canalicules. These canalicules proceed then parallel with one another, but slighting waving, or in form of spirals (which are recognized by a considerable enlargement), without new bifurcations. But when they reach the external surface of the dentine, they divide anew into a multitude of minute branches which terminate in the grand anastomotic plexus, some even entering the enamel. The dentinal canalicules have their walls, easily seen in transverse sections which have been for some time subjected to the action of dilute hydrochloric acid, which at first dissolves the fundamental substance leaving the canalicules intact; these are in turn dissolved a little later, if the immersion in the acid is prolonged. Each canalicule contains a soft and transparent

substance, of a viscous consistency, which is continuous with the pulp of the tooth and a dependant upon it. When dried, this substance almost completely disappears and the canalicules are filled with air; they then strongly reflect the light and appear as dark and even black lines. In longitudinal sections of dentine, we find lines curved and parallel to its general direction, more or less numerous, very unequally approaching one another which gives in them a stratified appearance; these have their explanation in the mode of development of this substance, which grows by the progressive addition of concentric layers in the direction of the dental cavity.

B.—Enamel.—The enamel, or vitreous substance, clothes with a smooth and shining layer the external portion of the crown. Its thickness is variable; very considerable at the triturating surface of the tooth, it gradually diminishes, to terminate at the neck in a thin and narrow border. The enamel has a milk-white color, but yet may take different shades, according to the temperament of the subject. It is diaphanous and homogeneous in character, its chemical constitution, very rich in calcareous matter, gives it a hardness which is much more resistant than either the dentine or the cement. The external face of the enamel, which is rugose, is covered by a thin amorphous pellicle discovered by Nasmyth and called by him the *persistent capsule.* This pellicle, named by Kœlliker the *enamel cuticle,* is a very thin membrane which may be separated from the enamel by means of hydrochloric acid; it is transpareut and may be regarded as a means of protection for the parts lying beneath.

The enamel is composed of fibres, or prisms, of five or six faces, of a length equal to its thickness, and from .003m. to .005m. in width, planted perpendicularly upon the dentine, to which they are closely united. The enamel prisms join one another by their different faces, without fundamental substance. In the direction of their length we see portions alternately opaque and light, which gives them an appearance not unlike that shown by the striated muscular fibres.

The enamel, once developed, is subject to but a slight organic movement. Such a movement exists, says Magitot, and in fact the changes of density and of color which take place during life cannot be overlooked, nor can the fragility which the tooth acquires when it is once separated from the economy, that is to say, when it is dead.

C.—Cement.—The cement represents the least considerable portion of the dental organ. It is a true osseous substance. In the human tooth it covers the whole external surface of the root, beginning at the neck of the tooth by a thin border, which extends a short distance over the enamel; it gradually becomes thicker as it nears the tip of the root, where its thickness is often as great as three or four millimetres, particularly in old persons, and where there are hypertrophied masses, known as exostoses, which are frequently found in gouty patients. The cement exteriorly looks not unlike bone; it is yellowish and opaque, of a density near that of bony tissue, but inferior to that of ivory. The external face of the cement, covered with minute tuberosities, is invested by the alveolo-dental membrane, which in this case performs the office of true periosteum. Considered as to its texture, the cement presents a close analogy with the bony tissue. Like this, it is composed of a fundamental substance, and of star-shaped cavities (the osteoplastic osseous corpuscles of Robin).

The fundamental substance, deprived of its calcareous salts by means of hydrochloric acid, appears like cartilage, and by heat is converted into gelatine. The osteoplasts are more irregular and unequal than in bone, their axes are parallel to that of the root but their prolongations take for the most part a transverse direction. They are wanting for about a third of the distance from the crown; often appearing only at about the median portion of the root, and always growing more nu nerous in proportion to their nearness to the tip of the root. The Haversian canals are found in man only when the cement has acquired a certain thickness, at the tip of the root, and in the hypertrophied masses spoken of above. But here we are in the face of a problem, viz., do the osteoplasts of the cement communicate by their divisions with the terminal branches of the dentinal canalicules? This has been asserted by some histologists, and Kœlliker himself describes a special system of intermediary canals, intending to establish these anatomoses. Hannover denies this, declaring that the cement is separated from the dentine by a peculiar substance, *intermediary layer*, transformed from the *intermediary membrane*, which opposes this intercommunication. We will say, then, with Magitot that, without calling in the aid of this membrane, which he has properly rejected, it is not necessary to admit this union between the canals of the dentine and the osteoplasts of the cement, inasmuch

as these two substances are too different, as well by their modes of development and of nutrition, which in the two tissues are independent.

### SOFT PORTIONS OF THE TEETH.

Under this name we include the dental pulp and the alveolo-dental membrane.

A.—Dental pulp. The dental pulp of the adult s nothing but the papilla or dental germ of the fetus, except that its volume is greatly diminished by the progressive development of the tooth. It occupies the central cavity of the dentine and is prolonged into the root. The papilla takes the form of the walls of the cavity which inclose it; it is therefore spindle-shaped in the canines, while in the molars it presents a number of conical projections, equal in number to the tubercles of the crown. As has been already said, its volume which is considerable in infancy, gradually becomes less with age, and in old age it is reduced to a mere thread, which entirely disappears toward the end of a long life, when the constant production of dentine has entirely obliterated the dental cavity. The dental pulp is a soft substance, of a grayish red color, and seems at its surface to have no adherence to the dentinal wall.

Considered histologically, the dental pulp of the adult presents but slight differences from the same organ in the fetus. It is formed of a tissue slightly fibrous, with a homogeneous, amorphous substance interposed; it is finely granular and transparent, and, in its midst are found embryoplastic nodules. These nodules are smaller than those of the fetus, but their character is identical. According to Magitot there are not found in the interior of the organ in the adult the crystals of hematoidin found by him in the embryo, whilst at the surface of the pulp the cellules of the dentine form a continuous layer. Blood vessels are very numerous in the dental pulp, producing the ruddy appearance so often seen. The pulp receives as many vessels and nerves as there are roots. These vessels enter the organ, and there ramifying terminate at a short distance from its surface. According to Kœlliker, the capillaries measure from .009 mm. to 010mm. in size, and form a very close mesh from whieh the veins issue. The pulp seems not to be supplied with lymphatics, but is, on the other hand, richly furnished with nerve filaments. Into each root a nerve filament penetrates which measures from .07mm. to .09mm. in diameter, accompanied by several branches, six

and even more, which are from .02mm. to .05mm. These branches also penetrate the pulp, there ramify and form a dense plexus which divides into primitive fibrilla, rather pale, which are hardly the .002 to .003mm. in diameter. A portion of these minute fibres end in loops (Wagner), and the rest in conical or button shaped extremities (Magitot).

As the question of the nerve endings in the dental organ are not finally determined for want of proof observations, and also on account of the great difficulties which such an investigation presents, I take the liberty of quoting the opinion of Professor Inzani of Parma who gives the mode of termination of nerves in the tooth as follows: The pale fibers surrounded by membranous tubes pass into the dentinal canals, then enter the enamel, where they terminate in a pencil of filaments swollen and luminous at their ends, where, enveloped by the nerve sheath, they form a club-shaped enlargement .018mm. in length, .006mm. in thickness at the bottom, and .002mm at its smallest portion.

The nerve filament passes into a tube between the papilla and either the dentine or the enamel, where the tube itself terminates on the dark bottom around the enlarged end.

The nerve fibres with double contours divide in the papilla or germ into pale fibres of which each forms a bundle of filaments, which, surrounded by a sheath, emerge from the papilla, dividing into numerous threads, which pass into the membranous tubes of the dentine as far as the enamel. It would seem that for the tooth as for other organs, each thread has attached numerous bundles of filaments or terminal enlargements.

B.—Membrane or Dental Periosteum.—The dental periosteum is a thin membrane in the alveolus interposed between the tooth and the process, and adhering closely to the cement which it covers on every part of its surface. Formed by the external envelope of the follicle, it has its origin at the neck of the tooth, often adhering strongly to the tissue of the gum, of which it seems to be only a continuation. It is this cirumstance which, in extracting, frequently causes the tearing of the gum, unless the precaution has been previously taken to separate the tooth from the soft parts. The periosteum then is directed towards the end of the root, sending out here and there fibrous attachments to the alveolar wall, until, having reached the very tip of the root, it there meets the vessels and nerves of the tooth over which it ex-

tends, forming, a sort of sheath, not, as has been thought, folding over into the dental canals and covering the surface of the pulp. These vessels are not then accompanied by the periosteum in their passage through the tooth but, on the contrary, come in direct contact with the dentine.

The structure of the alveolo-dental membrane,belongs at once to that of the mucous membrane of the gum and that of the periosteum of the bone so that we may consider it as intermediary. It is, in fact, formed of a fibrous connective tissue, without any trace of elastic fibres, permeated by a capillary net work, and by numerous nervous ramifications. The vascularity of this membrane, as well as its nervous richness, explain, in a manner that admits of no doubt, the frequent inflammations of which it is the seat, and the acute pains that accompany them. The alveolo-dental membrane may take on a great number of changes, which are still the subjects of investigation by several savants, among whom are some Italian authors of distinction. It seems that this membrane in the aged is subject to a kind of gradual hypertrophy which with other causes, brings about the physiologic loss of the dental organ.

## SELECTIONS.

### REPORT OF A PECULIAR CASE OF MALFORMATION OF THE JAWS, AND THE TREATMENT.[1]

BY W. W. ALLPORT, M. D., CHICAGO, ILL.

Read to the Section of Dental and Oral Surgery of the American Med. Association, May, 1884.

Mr. Chairman and Gentlemen.—The plaster casts I exhibit to you are models of a case that I have recently had under treatment. It had excited considerable interest and discussion among some of the surgeons and dentists of the patient's native State, but no definite treatment had been decided upon.

On taking up his residence in Chicago, the dentists at his home in New Hampshire advised that he put himself into my hands for such treatment as might be thought best, and the case is, I think,

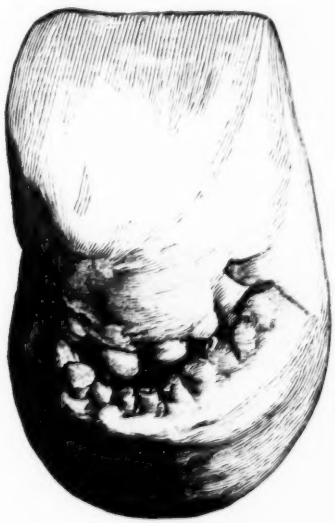
1. We are indebted to the Journal of the American Medical Association for the loan of the cuts illustrating this article.

of sufficient interest to warrant me in presenting it to the Section.

Mr. F. L. S——., aged 25 years, consulted me June 22, 1884, for a malformed condition of maxillary arches. The young gentleman is a graduate of Harvard College, and a civil engineer by profession.

The malformation was such as to make it impossible to properly masticate his food, and his personal appearance, especially when eating, was very unsightly and a source of great mortification.

The trouble was largely due to a lack of development of the upper jaw, consequent upon a failure in the formation and devel-

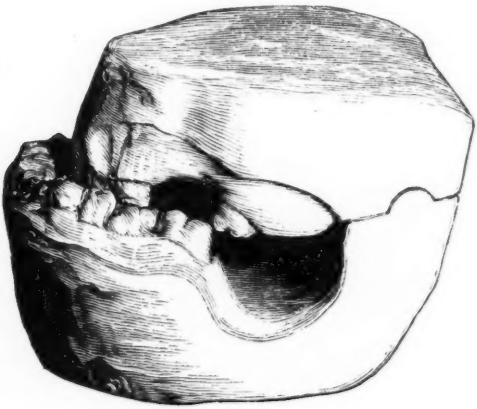


CUT NO. 1.

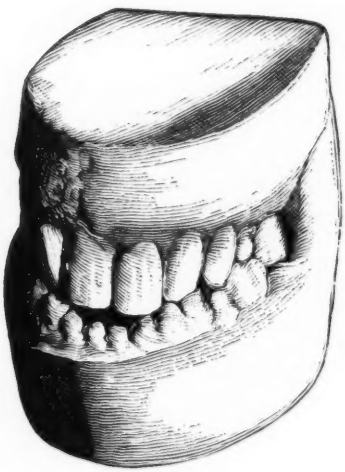
opment of the temporary and permanent teeth. Just how many temporary teeth were erupted I am unable to say, but from the best information gained, it is evident he did not have the full complement.

When the examination was made there were only seven teeth in the superior jaw, two temporary cuspids, two permanent central incisors, and three molars, the first and second upon the right side and the second upon the left, all being somewhat imperfect in

form, and these are the only permanent teeth that have made their appearance in this jaw. In the lower jaw the six anterior tempor-



Cut No. II.



Cut No. III.

ary teeth were still in position, though much worn away on the cutting edges (see cut No. 2), and the second temporary molars on

the left side, and both temporary molars on the right side, each considerably decayed. The permanent teeth were the first bicuspid on the left side, and the first molar on either side.

The angle of the lower jaw was less acute than normal, causing the jaw to protrude to a slight extent, but would have caused no marked deformity had the superior jaw been properly developed.

CUT NO. IV.

Cut No. 1 represents a front view of the case (taken from plaster casts) with the jaw closed to the full extent.

Cut No. 2 represents a side view of the same models, which shows the extent of the recession of the upper jaw, and the protrusion of the lower; also that the occlusion was such that when the jaws were closed "the bite" was so short as to produce a most unsightly appearanee of the face.

To lengthen the bite permanently, gold crowns were fitted over the only superior molar of the left side, and the anterior of the two molars on the right side, and so shaped as to cover in their occlusion about one-third of the grinding surface of the permanent molars in the lower jaw. By this process the bite was lengthened three-fourths of an inch, as evidenced by cuts No. 3 and No. 4, which placed the jaws in a normal position. After the jaws were thus thrown apart, the four front teeth were extracted, a gold plate was fitted to the mouth, and secured by heavy clasps around the gold crowns, and then mounted with artificial teeth secured to the plate by rubber attachments as represented in cut No. 3. Cut No. 4 is taken from a photograph of the gentleman after the operation was completed.

It is a matter of regret that a photograph was not taken with the mouth closed before the jaws were permanently thrown apart by the gold crowns, that the great change in the expression might be seen and contrasted with cut No. 4. But this can readily be imagined.—*Journal of the American Medical Association.*

## DENTAL SOCIETIES.

### AMERICAN DENTAL ASSOCIATION.

TWENTY-FOURTH ANNUAL MEETING AT SARATOGA.

Reported for the ARCHIVES OF DENTISTRY by Prof. Chas. Mayr.

(Continued from page 525.)

WEDNESDAY EVENING SESSION.

By special vote of the society the evening session was occupied by Dr. J. L. Williams, of New Haven, Conn., who read a paper upon "The Origin of Enamel and the nature of Odontoblastic Cells." It was illustrated by a great number of very beautiful preparations, the images of which were projected upon a screen by means of the stereopticon. Owing to the necessary darkening of the hall, as well as to the absorbing beauty of the preparations which continually distracted the reporter's attention, the notes of the paper are not as full and perfect as they might otherwise have been.

The speaker commenced by criticising the expressed views of Dr. Garretson, Dr. Cryer and others, and stated that he would demonstrate they were based upon faulty preparations and imperfect knowledge.

He had presented this matter at the last meeting of the New England Dental Society, and it was then privately remarked that it was of little importance whether or not his own theory was the correct one. He differed with them, for it was impossible for one to undertake, with any hope of success, such a work as the joining together of parts of broken teeth without a definite knowledge of the nature of the process. Besides, as professional men, it is our bounden duty to obtain all the knowledge possible of the tissues upon which we operate.

It is of the greatest importance that the student should be correctly taught concerning this subject. The purpose of this paper was to point out the most important fallacies still existing concerning the structure of the teeth. For that purpose he would consider what is stated about the papilla of the pulp, and show that there is an enamel organ which has a definite structure, and that the formation of this enamel organ takes place from the dentine outward. He would show that the odontoblasts are ganglionic elements, sending branches into the dentine and the pulp. To answer the question, why this was not established before, he would say that it is very difficult to obtain specimens that show the natural relations of the dental tissues to each other and the surrounding tissues, without breaking the continuity of the structures. A great number of microscopic slides were shown, most of them photographic; a few, diagramatic.

*First slide.* From a professional dealer in microscopical specimens. In this you may see the appearance of what Dr. Garretson calls the utricula reflexa. All the delicate structure, the basement membrane, and the enamel organ are destroyed; this slide has some historic value, just as the implements of the stone age tells us of the progress that has been made.

*Second slide.* This is in contrast with the foregoing. The old views were derived from balsam-mounted specimens, which define less distinctly than those mounted in glycerine. This slide shows the first differentiation that marks the beginning of the tissues; it is perfect in every way, except at one point. The groove of which Dr. Garretson speaks is filled out with the enamel organ, which is

destroyed very easily by careless preparation. The former logic in support of the theory about the formation of the enamel ran thus: The enamel is an epidermoid structure; all epidermoid structures are formed in the same manner —ergo, the enamel must be formed in same manner. This is only a trick of logic, not supported by any evidence. A vast amount of ignorance may conceal itself behind a general physical law. A little definite knowledge is better than generalizations, which may mean something sometimes, but generally do not. How a tissue which never grows after it has been destroyed, can be compared to one which is constantly thrown off and replaced by a new one, is beyond comprehension.

*Third slide.* Tinted a very little with carmine, beautifully shows the origin of the dental tubuli and their ends.

*Fourth slide.* Shows a permanent tooth, with the pulp removed and the dentine cells in some places intentionally forced away from the enamel.

*Fourth slide.* Shows a cut through a temporary tooth a little to one side of the center, cutting through the completely formed enamel with its hexagonally divided arrangement.

*Sixth slide.* Shows something like crochet work. It is possible that the enamel may be formed by intercellular deposits; of such formations we have analogies; the Placoid scales are formed in the same manner; they have spinous projections that have an enamel layer which is deposited as a cuticular deposit of the epidermis. This crochet-like looking tissue is from the embryonic shark; it looks like an embryonic tooth.

*Seventh slide.* Shows the cord which is drawn down at the first folding of the dental cyst,and which develops from the columnar layer of epithelium. It is already broken from its union with the upper layer, and the tooth cyst is isolated thereby; this specimen shows also the development of a beautiful reticulum of the enamel organ; I have not determined whether it is developed by direct reformation of cells or by a breaking down of embryonic tissue. After the completion of the enamel, the organ is exhausted, yet it remains on the lower side of the tooth until its work is also done there, after which it disappears.

*Ninth slide.* Shows an additional proof of the existence of the enamel organ; the enamel-forming cells and the reticulum are there, but the stellate cells, seen in the former specimen, are not

seen. On the top of the tooth the enamel organ has disappeared, and the calcification is complete. At the sides it is not complete,and therefore it still exists there. The pericementum makes its appearance, and thus a connection of the tooth with the external world is established.

*Tenth slide.* You remember that on a previous slide, No. 8, at the lower end of the enamel cap, there was shown a columnar layer of cells which came, in the development of the cord, from the columnar layer of epithelium above. This is a highly magnified view of this point at a later stage. The columnar layer has disappeared, and the space is occupied by indefinite embryonal tissue or indifferent corpuscles. The reticulum of the enamel pulp, shown here, is very beautiful. The embryonal corpuscles forming the lower part of the indifferent tissue are developed from the ameloblasts or enamel-forming cells.

*Eleventh slide.* Shows a somewhat advanced tooth germ; the ameloblasts are above the flattened layer; above it, is also visible the reticulum of the enamel organ.

*Twelfth slide.* Shows the amelobasts in the form of biscuits; the analysis proves that this portion is highly impregnated with lime salts. I, said he, call your attention to the odontoblasts. You know that Dr. Heitzman and others have represented them as round corpuscles, between which the dental fibrillæ pass. I have satisfied myself that this has been an erroneous view, but it was not until within a short time that I have succeeded in cutting a section so thin, that only one layer of odontoblasts was obtained. I can show you photographs in which the dental pulp and the enamel pulp are in perfect contact, and others, where the first faint traces of dentine and enamel appear. (The photograph was here exhibited.)

This specimen I exhibited to Drs. Heitzman, Bodecker, and Atkinson; Prof. Heitzman only glanced at it when he turned to Dr. Bodecker with frankness and said: "It is evident we have made a mistake;" subsequently, he thought he could detect delicate fibres passing between the fibrils.

*Thirteenth slide.* You see the prolongation of the odontoblasts into the tubuli; one point shows two fibrillæ originating from the odontoblasts. I discovered that sometimes three or more fibrillæ are projecting.

*Fourteenth slide.* I have often been asked how I explained the

formation of dentine. Do these cells perform a double function? are they the elements of sensation and of the formation of dentine? We often see a multiplicity of functions performed by embryonal cells. The odontoblasts are essentially neural matter and are probably also the secretive elements of the dentine. Some species of molluscs show similar cells in the digestive tract, and they are exhibited in the photographic slide, thus proving their multiplicity of function. I trust that this addition will prove of benefit to all. I have sometimes spoken a little sharply, because I would not like to see the results of the study of years set aside by a hasty examination of inferior specimens and sections.

At the close of the very instructive and interesting address of Dr. Williams, Dr. J. H. McKellops asked the suspension of the order of business that an announcement might be made. Leave being granted, he called upon Dr. W. C. Barrett, who aroused the sympathy of every member by relating, in a touching manner, the particulars of a very painful accident that had just occurred. The little motherless boy of Dr. W. R. Clifton, of Texas, was, in company with his aunt, crossing the street, when a carriage, driven at a reckless speed, ran over him, crushing the skull and breaking a number of bones. The sympathy of the Association was tendered Dr. Clifton, and the executive committee was, by vote, directed to engage physicians and nurses, and to take measures to bring the criminally reckless driver to justice.

*Dr. Atkinson.*—Desired to express his obligation to the writer of the paper, and had commenced a consideration of some of its points when he was interrupted by Dr. C. W. Spalding, who said that he had been so shocked by the relation of the terrible accident that he was in no mood for a discussion, and he thought others were in the same state. He therefore asked the speaker in possession of the floor to give way for a motion of adjournment.

*Dr. Atkinson.*—Said that he was astonished at the puerility of the excuse for adjournment. We were never more clearly in the way of right than when we were pursuing the path of duty and earnestly laboring at the business directly before us. He declined to give way and continued his remarks, but the sentiment of the meeting was evidently against him, and the members left in such numbers that an adjournment for want of a quorum was soon a necessity. The painful accident seriously interfered with the consideration of the paper.

WEDNESDAY MORNING SESSION.

*Prof. Chas. Mayr.*—Almost all differences in the different views about caries seems to come from an indefiniteness of what and where the caries really is. If a patient comes to you with an aching tooth, is the ache the caries? Certainly not. Or the tooth?—again not. Or the plug you dig out? Not at all! But while you begin to dig the patient first feels nothing, then he becomes nervous and complaining, as you reach a certain point, which irritability again disappears, when you come into healthy dentine. The "caries" comprises therefore only that small diseased layer, probably not over $\frac{1}{100}$ of an inch thick, which was sensitive; outside we have the worthless plug or corpse of the tooth substance; inside, the healthy tooth. Dr. Miller seems to have mostly examined the corpse, and produced the corpse, but not enough of that extremely small border line. In an abscess, the pus is not the seat of the disease, nor the inflamed tissue underneath, but that small layer of tissue where the physiological—or, if some fogies like the word better, pathological—processes are going on, and the study of this layer will enlighten us about the abscess, but neither the pus or the inflamed tissue underneath will tell us much.

*Dr. Atkinson.*[1]—What is a process? It is a going on of something. What is a thing; a thing is a think. Pathology is only perverted physiology. The function of building a tooth is its evolution, the decay, decadence, its downfall. Thanks to Carl Heitzman and to the angel that squeezed him from Rokitansky's laboratory and sent him over to us, the most ignorant may work now as intelligently as such angel. The typal order of the enamel is a modification of that of the dentine. The enamel is really a living tissue as shown by the presence of protoplastic strings between the enamel rods. The bacteria are not found in the basis substance but in the tubuli of the dentine, going towards the pulp. There are bodies that we have not seen with the highest power of amplication and concentration of light, we may call them ghosts, the ghost of the bacterium is there, before the bacterium can begin, but when we can color them we only deal with the tracks of ghosts; but the tracks would not feed of us we want to have a ghost for dinner.

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We wish everybody would read the full speeches of Dr. Atkinson in the final report. Their fine logical web cannot be extracted, we only give a few aphorisms.

Miller was honest. Do you know, that it is the greatest insult to a man, to have it said of him, he is honest. I would rather like to take five hundred boys of ten years of age that have good English education to understand my English and agree to make them good anatomists, physicists, pathologists, therapeuticists and operators in five years, than take five graduates? Why? Because the latter have said: Error, be thou my truth. Darkness, be thou my light! That is what they haye done from the Pope down.

*Dr. Spalding.*—I have long held that there was no pathology except that which proceeds from physiology; that there is no pathology, *per se*, neither in function nor in growth. The proeesses are all inverted or perverted physiological processes, and the growths are physiological growths out of place.

Our text books are full of descriptions of pathological anatomy, pathological growths and pathologicul processes. When, as Dr. Atkinson has just said, there are really no such things; but they are simply inversions of true physiological forces which arecalled pathological.

I only intended to enforce the idea advanced by Dr. Atkinson.

*Dr. Barrett.*—We spent considerable time this forenoon soaring in the infinite. Let us come down to a cash basis. We come here not to study or consider ghosts but material things. We all like to hear Dr. Atkinson, but the question up now is not to study the tracks, but the game. Let us go down to the actual demonstration and actual experiments. We cannot speak of the power of a bacterium, as that of a raging animal,boring into the teeth for the purpose of devouring living tissue, that is not the character of the fungi of caries, they are of a vegetable nature. Putrefactive and fermentative conditions, are almost the converse, putrefaction does not exist as the same time with fermentation. Forevery one experiment Prof. Mayr has made Dr. Miller has made fifty. According to my own stand-point, the rationale of decay is about like this. First there will be the decalcification of the exterior portion of the enamel; after the decalcification of the enamel the dentine is reached and on one—may be single—point, tbe lime salts are removed, the substance becomes a spongy mass, which takes up within its pores sacharine fluids from the mouth, which are favorable to the development of fermentive fungi; these fungi eat the spongy mass. In the course of their existence, they produce an acid which Dr.Miller

proved to be lactic acid,which continues the work of decalcification and so ad infinitum.

*Dr. Abbott.*—Dr. Barrett said we ought to deal with actualities and not with ghosts. What we have been able to discern with the naked eye or the strongest power of the microscope. Does this put us into a position to say that there is nothing beyond? It was only a few years ago that microscopes which magnified 500 diameters were something wonderful—remarkable; but there must be something smaller and smaller, as Dr. Atkinson said, a ghost. Dr. Miller seems to neglect the tact that the tooth has 25 to 30 per cent. of organic material and is a live organ and considers too much the organic salts.

EVENING SESSION.

*The Speaker* demonstrated how former exploration of the growth of the enamel pulp and the dental grooves were due to falty preparations; the paper was elaborate and without the illustration of little instructive value. We can only advise our readers to get the full report of it; it is exceedingly valuable and well worth reading, and we do not remember to have listened to as lucid a demonstration of the intricate and dry microscopic details of the development of the enamel as that paper of Dr. Williams gives.

*Dr. Atkinson.*—I can hardly restrain my joy at the progress, made in dealing plainly and simply with the most profound research and interpretation of the manner in which the elements of the teeth are brought within the scope of our perception. Let us dilate a little upon the mannar in which we have been blessed by this very rare treat, the chairman of the committee of arrangements had the good fortune to secure.

The accident which happened to the child of Dr. Clifford of Waco, Texas, is reported, and the association passes a vote of sympathy, the president of the town is introduced and promises to act vigorously in the matter.

*Dr. Atkinson.*—Proceeding after this interesting story Dr. Spalding think it might be untender, but Dr. Atkinson replies of the best way to show sympathy is to go right ahead in our duty. Dr. Atkinson also adds some more historical explrnation as to the difference between the conceptions of the school in Philadelphia and Dr. Williams. Adjourned.

[TO BE CONTINUED.]

## FLORIDA STATE DENTAL ASSOCIATION.

Pursuant to a call, a large number of the Dentists of Florida, met in Library Hall, Jacksonville, Fla., Oct. 15, 1884, and organized the "Florida State Dental Association," by the adoption of constitution, by-laws and code of ethics and the election of the following officers:

President, Dr. James Chace, Cedar Keys; First Vice-President, Dr. W. W. Towsend, Orlando; Second Vice-President, Dr. W. McL. Dancy, Jacksonville; Recording and Corresponding Secretary, Dr. Duff Post, Tampa; Treasurer, Dr. H. M. Graniss, Orlando.

A committee was appointed to draft a bill to be submitted to the State Legislature and the Secretary was instructed to mail to every dentist in the state a copy of a resolution, passed by the Association, requesting them to use their influence with their representatives in the Legislature to vote for the bill to become a law.

Dr. W. McL. Dancy, was unanimously elected a delegate to back the Southern and American Dental Associations.

Tampa was selected as the next place of meeting.

The Association then adjourned to meet in Tampa the first week in May, 1885.

DUFF POST,
Recording and Corresponding Sec'y.
Tampa, Fla.

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## CHICAGO DENTAL SOCIETY.

Reported by P. J. Kester, D. D. S., No. 628 West Lake Street.

The regular meeting of the Chicago Dental Society was held in the Chicago College of Dental Surgery rooms, Tuesday evening October 7, Dr. Harlan in the chair. The subject for the evening was Pregnancy and its effects on the teeth of the mother and child. The discussion was opened by Dr. Geo. H. Cushing. He said the inference was that there were adverse conditions during pregnancy. We are not prepared to admit that pregnancy is a disease, but the present state of society seems to make it so. which is true to such an extent that nearly every woman during this period considers herself a fit subject for the physician's care.

The effect upon the teeth of the mother or child, whether it be

good or evil must be brought about through nutrition. During a healthy pregnancy the nutritive process is carried on at its height.

According to a German author it was found that in the mouths of anæmic patients the saliva swarms with leptothrix, and in many cases where death ensued, a post-mortem developed the fact that the liver also contained them in great numbers.

The teeth of the mother are affected during pregnancy by the general disturbance of the system and more especially the nutritive process; nausea, morbid appetite, etc, are some of the symptoms usually present, and that the child should suffer seems perfectly natural.

The treatment during this period can be summed up in the one word hygiene, a subject which we as dentists do not give the attention, that it merits.

*Dr. Brophy.*— Believes that morbid appetites during pregnancy are an index to the needs of the system and should be satisfied, and such food as will build up all of the tissues of the body should be provided.

*Dr. Newkirk.*—Hereditary influences are to be considered; whatever would affect the general health would affect the teeth.

That the teeth suffer during pregnancy is probably due to a lack of proper assimilation of the elements necessary to the nourishment of the system. As to treatment he would recommend out door exercise, pure air and simple wholesome food.

*Dr. Wassall*—There is one cause of the decay of the mother's teeth that has not been mentioned. Lack of care and attention, which may be called a local cause. That the fluids of the mouth are depraved during pregnancy, from disturbance of the general system, is a reason why the teeth should receive especial attention at this time.

*Dr. Swain.*—The effects of the general disturbance on the secretions of the mouth and lack of care would account for the great number of germs and micro-organisms found in the mouth.

*Dr. Harlan.*—If in the early stages of pregnancy the teeth are put in good condition, and properly taken care of, the fluids of the mouth are not liable to become vitiated. I have noticed that the teeth of patients with very dark or very light hair are less liable to decay then those of the medium shade. When

white spots appear on the teeth during pregnancy, they can be removed and polished if seen soon after delivery, thus obviating the necessity for filling.

Syrup Lacto-Phos. of Lime may be given in doses of ½ to ⅓ tea spoonful to relieve the nausea of pregnancy.

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## MASSACHUSETTS DENTAL SOCIETY.

The tweniieth annual meeting of the Massachusetts Dental Society will be held in the rooms of the Boston Medical Library Association No. 19 Boylston Place, Thursday and Friday, December 11 and 12, 1884, commencing at 11 o'clock Thursday.

W. E. PAGE D. M. D., Secretary.
11 Studio Building, 110 Tremont St.

Boston, Nov. 25, 1884.

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# JOURNALISTIC.

**"Reading maketh a full man; conference, a ready man; and writing, an exact man."**

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EXPERIMENTS ON MODELING COMPOSITION. By Stewart J. Spencer, D. D. S., San Francisco, appears as the second article in the October *Ohio State Journal*. He used two kinds of the material hard and soft, but does not tell us the composition of either. He thinks that where strong compression is required to equalize the pressure of a full plate on an irregularly hard and soft mouth, this composition used hard and with strong pressure is unparalleled as an impression material. With regard to its ulterior uses, he has found it well adapted for duplicating models, but his experience with it for base plates and articulating impressions has been decidedly unfavorable. In summing up he says, that it requires more skill and acquaintance with it, to take a correct impression, than with either plaster or wax, but if understood is very useful and nice to use. The harder material proved itself in these experiments to be the better in almost every instance.

CHEMISTRY (?) Dr. Watt in an editorial with this title endeavors to correct a false impression regarding arsenic. "That arsenic, in

some way, continues to advance into dead tissue, we have demonstrated by taking a pieceof muscle from an ox. A piece half an inch long was laid on a fragment of clean glass. A very minute quantity of arseuic was applied to one end of the flesh, leaving no surplus or residue. It was kept in the dark, in a cool room, and, from time to time, slices were cut off from the distal end and tested. Several trials were made before arsenic was found, but it due time it permeated the entire piece of muscle. * * * Of the fact that arsenic is absorbed, or, at least that it permeates tissues to considerable distances beyond the points of its application, the proof is abundant and easily found."

THERAPEUTIC PROPERTIES OF TIN is also discussed by Dr. Watt. He says, that tin has no therapeutic influence, but it may be acted upon by chlorine and the chloride of tin is highly antiseptic. He says. "We can understand that tin, in contact with gold, and immersed in the buccal fluids is more likely to be chemically acted on and the action is likely to be more energetic than if the gold were not present."

FOR SENSIVIVE DENTINE.—*Items of Interest.*—"Dr. T. A. Robinson, it will be seen in our report of the American Dental Association, recommends equal parts, by weight, of carbolic acid and caustic potash ground together.

He applies in small portions to the cavity, and in a few minutes wipes it away, repeating it if necessary. He also finds it good as an application to aching exposed pulps preparatory to treatment. It sometimes gives a little pain—but not severe. He modified it, occasionally, by adding oil of cloves, or creasote, as in his judgment the case might require. He had used it for about twelve years with increasing satisfaction. He thinks it seldom needful to destroy exposed pulps."

"THE MINNESOTA DENTAL ASSOCIATION has had its first session. This State almost completes the circle of States; a few more left. Its officers for the ensuing year are taken from its best operators."

The *Items* must be mistaken in the above. In 1873 and 1874 we had the pleasure of attending the meetings of the Minnesota State Dental Association, and in the July number of the MISSOURI DENTAL JOURNAL, for 1875, we find the following:

DEAR SIR:—I enclose a synopsis of the proceedings of the

Fourth Annual Meeting of the Minnesota State Dental Association, with the request under instructions from the Society, that the same be published in your journal. Yours truly,

WALTER F. LEWIS,
Secretary M. S. D. A.

The Society has been sleeping for some years, and perhaps it has forgotten all about the past.

LEADING FLORIDA dentists were to meet at Jacksonville, October 15, to form a State Association.

DEODORIZED IODOFORM. *The Canadian Practitioner* contains the following formula:

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| Iodoform, - - - - - - | 18 grammes. |
| Sulphate of quinine, - - - | 3 " |
| Powdered charcoal, - - - | 15 " |
| Essence of peppermint, - - - | 40 drops. |

Thus prepared the iodoform may be associated with the ordinary liquid excipients.

THE MAINTENANCE OF HEALTH AMONGST THE PRACTITIONERS OF DENTAL SURGERY. Discussion upon Mr. Oakley Cole's paper read before the Odontological Society of Great Britain, published in *The British Journal of Dental Science.* Dr. George Field said he had had some experience of bad health, and he should be very glad to find a means of escaping it in the future. He thought the fact that dentists as a rule worked in a room with a northern aspect, was one element affecting their health; they did not get enough sunshine.

For the last four years he had worked under a southwest aspect, and he believed he had been better for it; the light was somewhat changeable, but he did not find this a serious objection. He was accustomed to work with a open window whenever the weather would permit.

There was the question of exercise, and as to this he would suggest to those who had not tried it a remedy which he had found em inently beneficial in his own case,viz.,the use of a tricycle. He had been accustomed to sit at his work for some years past. He used what was called a "shooter's walking-stick," which was very light, easily adjustable, and permitted great freedom of movement to the body. Itwas the best contrivance of the kind with which he was acquainted. H.

# MISCELLANY.

## TREPHINING OVER THE FRONTAL SINUSES

BY T. O. SUMMERS, M. D., JACKSONVILLE, FLA., FORMERLY OF NASHVILLE, TENN.

In the September number of the *Practitioner* I presented to your readers an interesting case of mastoid diseases relieved by the trephine. I have to offer you this month the report of a case, most remarkable in its history, and most satisfactory in its ultimate issue.

Several years ago, Mrs. P—., while holding a child in her lap was accidentally struck by the little fellow just over the upper and inner angle of the orbit, producing a contusion remarkably greater than might have been expected from such a blow. Her health at the time was bad, and before the ecchymosis had subsided, she was confined to her bed with typhoid pneumonia. In this low condition of her system, reparation of even the slightest injury was out of the question. Ulceration of the bruised spot set in and was rapidly destructive, denuding the bone and attacking in turn the thin shell which forms the outer wall of the frontal sinuses. The cavity was soon entered and from the posterior plate sprang up an osteo-fungoid pillar, like the stem of a young cauliflower, about 6 millimeters, or say a quarter of an inch in diameter. This was capped with a granulated efflorescence and altogether resembled a young mushroom before the umbrella is opened. The skin of the forehead fitted closely about the stem of this growth, which protruded about 5 millimeters above the plane of the integument. From this place a sanious pus continually exuded, and constant facial neuralgia rendered existence almost unbearable.

I examined the case August 6, and resolved to trephine the next day. Assisted by my associate, Dr. J. M. Coyle, I dissected the integument from about the pillar of osteo-fungoid, as I have termed it, and lifted it over the cap, the hole in the skin being bevelled at the expense of its external surface, and the edge resembling the selvege of cloth.

After planting the trephine, including in its crown the bony excresence, we bored down to the internal plate and finished with the dental engine by burrowing beneath the line of the

trephine crown, bevelling down to the dura mater and then lifted out the button with the excresence attached. The internal plate was ulcerated and soft, but the dura mater beneath was intact. The patient has completely recovered without a single unfavorable symptom or the slightest vestige of facial neuralgia.

What was this excresence?

I have decided that it was an imperfect development of bone, not reaching the plane of physiological structure—a perverted nutrition the result of zymotic sanguification.

*Southern Practitioner.*

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## MONTHLY LIST OF PATENTS.

The monthly list of patents for inventions relating to Dentistry, bearing date October 21, 1884, reported expressly for this paper by Louis Bagger & Co., Mechanical Experts and Solicitors of Patents, Washington, D. C.

306,298. Dentists' file holder, J. Z. Walling, New York, N. Y.

305,900. Dental impression cup, R. F. Crowther, Baltimore, Md.

306,421. Disinfecting apparatus, S. W. Parker, and H. Blackman, New York, N. Y.

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THE LATER ANESTHETIC.— About two hundred people of scientific inclination gathered at Market Hall, St. Paul, Minn., a few weeks ago, to listen to Dr. Howland's illustrated lecture on anesthesia. The stage was plentifully supplied with scientific apparatus, and the audience, though small as to numbers, found the lecture entertaining and instructive. Dr. Howland stated that from his own experiments and the practical operations in Paris, he believed that the administration of nitrous-oxide and air, or nitrous-oxide and oxygen, in condensed air chambers, will yet supersede the use of ether and chloroform in prolonged dental and surgical operations. The reason why nitrous-oxide cannot be used for prolonged operations, as ordinarily administered, is that the blood does not obtain any oxygen from it, the nitrous-oxide being exhaled from the lungs undecomposed; and if breathed without air, oxygen will produce asphyxia. He had administered nitrous-oxide for dental and surgical operations to more than 30,000 per-

sons, and had found that when pure nitrous-oxide is administered without any admixture of air, the average time of producing anæsthesia is fifty seconds, and the average time from the first commencement of the breathing of the gas until the return of consciousness is two minutes. He claimed that anæsthesia can be produced for prolonged operations, by means of nitrous-oxide, eighty-five parts, and oxygen, fifteen parts, without danger of unpleasant sensations. The lecturer next proceeded to demonstrate his theory, using a chicken for that purpose. The chicken was put in a small air chamber and condensed nitrous-oxide forced from a rubber bag into it, and after a brief space oxygen was added. The chicken was found to be thoroughly anæstheized. The audience filed upon the stage and inspected the "subject," after which it was restored to consciousness, and was apparently as well as ever. The lecturer instanced several important surgical operations which had been performed through this new agency in Europe and in America, and concluded, after some further interesting scientific demonstrations, by claiming that the time would soon come when chloroform and ether would be superseded by this new and harmless anæsthetic.

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Amalgam Note.—Dr. Bogue at a recent meeting the New York Odontological Society, said:

"I must confess my disappointment when I hear gentlemen of The Odontological Society speak of squeezing their amalgam, and I am not surprised that any gentleman who manipulates his amalgam this way should find it utterly unreliable.

"It is not much more than a month since one of my professional brethren said to me, 'What do you mean by weighing the component parts of your amalgam;I could not spend the time, how do you do it?' Now I supposed that every member of this Society knew a Fletcher Balance as well as I know a water jug. This gentleman did not. I showed him how to use it and he acknowledged it was a good thing.

"I frequently see the names of gentlemen belonging to the Odontological Society are given to the makers of amalgams, certifying this: 'Your amalgam is the best I have ever used,' etc. Either this means something or it means nothing. If he has carefully tested by mechanical and chemical tests, and by specific gravity, and

knows whereof he affirms, that testimony ought to be valuable, but if he merely guesses and tells of some fillings he guesses have been in six months or guesses they have been in six years, and says they look well; if he rubs the amalgam in his hand and says, 'Yes, I will give you a certificate,' it does not show that in this 'district school' we are learning a great deal."

## EDITORIAL.

The subject of pulpless teeth has been under discussion in late numbers of the *Medical Record*, and the opinion has been expressed by a contributor, and endorsed by the editor, that all such teeth should be promptly removed from the jaws.

The subject was introduced by Samuel Sexton M. D., who expressed the belief that since dead and diseased teeth have been so carefully retained by dentists, nervous diseases about the head have become alarmingly common; and he closed his communication by saying that "he sometimes thought the evil done by ill-advised dentistry was greater than the possible good arising from the work of the more capable dentists."

Dr. Sexton's observations upon the patients of a public infirmary are no doubt mainly limited to persons who employ inferior dentists whose operations are no more comparable with those of the "more capable dentists" than are the practices of quack doctors with those of the more capable physicians.

But how happens it that so much of this "ill-advised dentistry" is done? The reason is obvious. Until within a very few years any one who chose, could engage in the practice of dentistry, and no matter how incompetent he may be, persevering advertising would bring him subjects, and as neither the public nor the physicians were, or are capable of judging the quality of a dental operation, a good deal of work would be done, and much money collected before the incompetence of such advertising dentist would be ascertained. The money received would pay for more advertising and thus bring more victims, and so the work would go on *ad-indefinitum*, as well as *ad-nauseum*. It is our deliberately expressed conviction that there is in the community no other equally intelligent class who are responsible for this state of things to the same

extent as are medical men. If they do not encourage "ill-advised dentistry" they do not discourage it. They are often looked to for advice on this subject by their clientage, who we regret to say, are sometimes illy advised.

Dentists have struggled hard and long to rid their profession of this incubus which brings them into disrepute, and their efforts in this direction have met with little support from the medical profession. There are notable and noble exceptions to this statement we know, and they are duly respected and honored.

The editor of the *Medical Record* speaks of the "peril of tooth-saving" as if there was danger in the attempt. This every intelligent dentist knows is a misapprehension. As well might *we* complain of the perils of finger-saving in a case of felon, or of eye-saving in a case of iritis or of cataract, or of limb-saving in a case of abscess.

Pulpless teeth are not necessarily dead. The terms "pulpless teeth" and "dead teeth" are by no means synonymous.

Is not an inflamed tooth-pulp or periosteum amenable to treatment on the same principles as are inflammations in other organs and tissues? Let the editor of the *Medical Record* answer! If evidence were needed to demonstrate the necessity for the better education of physicians in diseases of the teeth, the articles under discussion would afford that evidence. The fact that physicians are so illy informed upon this subject is not so much their fault as it is their misfortune. Medical text books contain little or nothing upon dental diseases, and no more is taught, at least until very recently, in medical schools. Consequently, they could not be expected to be well-informed upon this subject, and should not be held responsible for the errors of diagnosis and prognosis which they so often commit when attempting to pass upon either the nature or the causes of diseases of the teeth, or of reflex or sympathetic affections arising therefrom. The remedy for the whole difficulty is very simple. It consists in the better education of dentists in certain branches of medicine, and the better education of physicians in certain branches of dentistry.

The former is now well provided for by the dental colleges, and the importance of the latter has already been recognized and acted upon by a portion of the medical schools.

The present duty of physicians is to exercise more care in the selection of the dentists whom they recommend, and to avoid cast-

ing upon the dental profession the sins of uneducated and incompetent men who call themselves dentists, but are not recognized by any of the organized bodies of that profession.

The chief difficulty of the position at this time, and the main cause of complaint against physicians is, that as a rule, they do not properly discriminate between the educated and the uneducated practitiouers of our art. SIGMA.

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The article on the Histogeny and Histology of the teeth, translated from the French for this journal, and published in this and the preceeding numbers, will furnish to such of our readers, as are familiar with the subjects treated of, a convenient compendium of the views that prevail on the continent of Europe at this time upon this important branch of dental science, and at the same time afford an opportunity for comparison with those held in this country. To those who have not studied the subject attentively, the translation will present the matter in a brief yet comprehensive way, which will impart ideas upon the subject in a manner clear enough to enlist their interest and lead them to the future study of subject for themselves. Its careful perusal, will, we feel sure, interest both classes, and to the latter serve as a synopsis, which will stimulate to a study of the subject more in detail.

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It is not often the case, when one gets married, that the event is spoken of as a "death," or that one of the parties to the transaction is referred to as "deceased," etc. Some of our cotemporaries, in referring editorially to the recent *consolidation* of the ARCHIVES and the *New England Journal of Dentistry*, either misunderstand a plain statement or wish to mislead the profession. To record, without modification, of the *New England Journal of Dentistry* that it is "no more" is a mistake. To state, in an unqualified manner that it has "succumbed" is—if the word is used intentionally and with an intelligent appreciation of its true meaning—an egregious mistake.

*The New England Journal* protests that it is not ready for an obituary notice; that it is not "deceased." Neither have its editors "dried" their "pens." "Self-denying labors have not ceased' and "weary brains" refuse the "rest" to which they are consigned.

A simple change in names or, in other words, "getting married," does not warrant or justify a friendly cotemporary in the use of

such terms as "deceased," "succumbed," etc. There is nothing of the kind involved in the transaction, and the editors of *The New England Journal* decline to be buried by means of sugar coated obituary notices. They have other "fallacies" to maintain and rejoice that the new arrangement affords a larger field in which to disseminate them.

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Some months since we intimated that an iridium gold would be a good thing, and soon we were in receipt of some, from two sources, in the form of heavy foil, and upon practical tests, it proved no improvement upon the platinum gold, shade 3. A rich alloy of the metal does not work favorably in the form of foil, and we wish to suggest that some crystalline form of iridium, or iridium and platinum, electro-gilded, would probably accomplish the desired result, a hard enamel surface for gold fillings. M.

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To an itinerant dentist who traveled through the Southern states thirty years ago, credit should be given for combining gold and tin in alternate layers, gilding his tin-foil with gold leaf, and collecting fees for gold fillings. M.

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In consequence of an unexpected delay in the preparation of the title page and index to both the ARCHIVES and the *New England Journal of Dentistry* they will be mailed when completed.

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Back numbers of *The New England Journal of Dentistry*, also a few full sets of the same can be had by addressing, Dr. C. T. Stockwell, Springfield, Mass.

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## A WORD TO EARNEST WORKERS.

Instruct your patients to take proper care of their mouths to brush the teeth and gums after meals, rinse the mouth with tepid water, pick the teeth with small quill tooth-pick, and use a narrow strip of rubber dam to cleanse spaces too narrow for the quill to go through. Be the decay caused by chemical or parasitical agents, we know they thrive only in filthy mouths, and that cleanliness is death to them. Such care will prevent more bungling dentistry than all theories combined, and when our microscopists return from their little trip, "all among the little stars sailing around the moon," they will be able to find those little fellows with black heads and red eyes. M.

## PUBLISHERS SPECIAL NOTICE.

The publishers of the ARCHIVES of DENTISTRY are engaged solely in the printing and publishing business, and have embarked in this enterprize in the belief that the dental profession are ready to patronize and sustain a *strictly first class* INDEPENDENT journal such as the ARCHIVES now is and will continue to be.

The Dental Journal Association, which controls the columns of the ARCHIVES was organized solely in the interests of the profession of dentistry, and its members contribute their money, their time and their talents to the end that the periodical literature of dentistsy in this country' may be relieved of the interests ot trade and become established upon the same basis as the periodical literature of other learned professions.

The business of this journal will therefore be conducted as i that of the periodicals of other professions, upon a money basis; consequently, while first class advertisements are hereby solicited, and our circulation is large enough to attract such advertisements, payment herefor cannot be accepted in anything but money or its equivelant.

The publishers wish to say to the subscribers in the *New England Journal of Dentistry*, that their subscriptions to the new journal for the year 1885 are hereby solicited, that the price of the consolidated journal will be $.300 per annum, payable on April 15, of each year, and that assuming that they will all wish to continue their subscriptions, the ARCHIVES will be sent to them unless its discontinuance is requested.

We believe the united forces now composing the editorial corps of the ARCHIVES will make the journal well worth the subscription price, but if after a thorough examination and a fair trial its continuance is not desired, we shall be pleased to be so advised, either by the return of a number or in any other convenient way.

We also wish to inform our subscribers that the ARCHIVES has no connection with general news paper agents or solicitors, and that all orders must come to the publishers either directly, or through their regular authorized agents or any member of its editorial staff.

All moneys on account of subscriptions or advertisements should be remitted direct to the publishers as no one is authorized to make any collections for us.